CLAIMS

1. (previously presented) A composition of matter comprising a dispersion of isolated lactoferrin immobilized on a naturally occurring substrate not including gelatin via the N-terminus region of the lactoferrin.

2. (currently amended) The composition in accordance with claim 1, wherein the naturally occurring substrate not including gelatin is a protein, a polysaccharide, a nucleic acid, or a nucleotide~~, or a lipid~~.

3. (currently amended) The composition in accordance with claim 1, wherein the naturally occurring substrate not including, gelatin is collagen, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate ~~or a triglyceride~~.

4. (previously presented) The composition in accordance with claim 1, wherein the naturally occurring substrate not including gelatin is a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

5. (previously presented) The composition of claim 1, wherein the dispersion is an aqueous solution, an aqueous emulsion, a colloid, a suspension, a powder, or a granular solid.

6. (currently amended) A composition of matter comprising a dispersion of isolated lactoferrin ~~immibolized~~ immobilized on a naturally occurring substrate via the N-terminus region of the lactoferrin, and native lactoferrin.

7. (previously presented) The composition in accordance with claim 6, wherein the concentration of immobilized lactoferrin and native lactoferrin in the dispersion is from about 0.05% wt/vol to about 2.5 % wt/vol.

8. (previously presented) The composition in accordance with claim 6, wherein the molar ratio of immobilized lactoferrin to native lactoferrin is a ratio of from about 1:1 to about 1:10.

9. (previously presented) The composition in accordance with claim 6, wherein the molar ratio of immobilized lactoferrin to native lactoferrin is a ratio of from about 1:1 to about 1:5.

10. (previously presented) The composition in accordance with claim 6, wherein the composition comprises about 1 % wt/vol immobilized lactoferrin and about 1 wt/vol native lactoferrin.

11. (previously presented) The composition in accordance with claim 1, wherein the composition further comprises a buffer system.

12. (previously presented) The composition in accordance with claim 11, wherein the buffer system contains a physiologically acceptable acid, a physiologically acceptable base, and a physiologically acceptable salt.

13. (previously presented) The composition in accordance with claim 12, wherein the physiologically acceptable acid is oxalic acid, ethylenediamine tetraacetic acid, carbonic acid, or citric acid; the physiologically acceptable base is sodium bicarbonate, potassium bicarbonate, sodium carbonate, or potassium carbonate; and the physiologically acceptable salt is calcium chloride, potassium chloride or sodium chloride.

14. (currently amended) A composition of matter comprising an aqueous buffer solution containing a physiologically acceptable acid selected from the group consisting of oxalic acid, ethylenediamine tetraacetic acid, carbonic acid, and citric acid; a physiologically acceptable base; and a physiologically acceptable salt selected from the group consisting of calcium chloride, potassium chloride, and sodium chloride, wherein the ratio of acid to base to salt is 0.1 to 0.0001 M (acid) : 1 to 0.001 M (base) : 10 to 0.01M (salt) and containing a mixture of native lactoferrin and isolated lactoferrin immobilized on a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues, collagen, gelatin, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate ~~or a triglyceride~~ via the N-terminus region of the lactoferrin, in a native lactoferrin to isolated immobilized lactoferrin molar ratio of from about 1:1 to about 1:5 and in a concentration of from about 0.001 to about 2.5 % wt/vol.

15. (previously presented) The composition in accordance with claim 14, wherein the lactoferrin is immobilized on a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

16. (previously presented) The composition in accordance with claim 14, wherein the mixture comprises about 1 % wt/vol immobilized lactoferrin and about 1 wt/vol native lactoferrin.

17. (previously presented) The composition in accordance with claim 14, wherein the physiologically acceptable acid is citric acid, the physiologically acceptable base is sodium bicarbonate and the physiologically acceptable salt is sodium chloride.

18. (previously presented) A method for reducing the microbial contamination of a composition subject to microbial contamination by a microbe, comprising: treating the composition with a sufficient amount of isolated lactoferrin immobilized on a naturally occurring substrate not including gelatin via the N-terminus region of the lactoferrin to reduce microbial contamination.

19. (currently amended) The method in accordance with claim 18, wherein the naturally occurring substrate is a protein, a polysaccharide, a nucleic acid, or a nucleotide~~, or a lipid~~.

20. (currently amended) The method in accordance with claim 18, wherein the naturally occurring substrate not including, gelatin is collagen, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate~~, or a triglyceride~~.

21. (previously presented) The method in accordance with claim 18, wherein the naturally occurring substrate is a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

22. (previously presented) The method of claim 18, wherein the composition is an aqueous solution, an aqueous emulsion, a colloid, a suspension, a powder, or a granular solid.

23. (previously presented) The method in accordance with claim 18, further comprising applying a composition containing a mixture of immobilized lactoferrin and native lactoferrin.

24. (previously presented) The method in accordance with claim 23, wherein the concentration of the mixture in the composition is from about 0.001 to about 2.5% wt/vol.

25. (previously presented) The method in accordance with claim 23, wherein the molar ratio of immobilized lactoferrin to native lactoferrin in the mixture is in a ratio of from about 1:1 to about 1:10.

26. (previously presented) The method in accordance with claim 23, wherein the molar ratio of immobilized lactoferrin to native lactoferrin in the mixture is in a ratio of from about 1:1 to about 1:5.

27. (previously presented) The method in accordance with claim 23, wherein the mixture comprises about 1 % wt/vol immobilized lactoferrin and about 1 % wt/vol native lactoferrin.

28. (previously presented) The method in accordance with claim 22, wherein the aqueous solution further comprises a buffer system.

29. (previously presented) The method in accordance with claim 28, wherein the buffer system contains a physiologically acceptable acid, a physiologically acceptable base, and a physiologically acceptable salt.

30. (previously presented) The method in accordance with claim 29, wherein the physiologically acceptable acid is oxalic acid, ethylenediamine tetraacetic acid, carbonic acid, or citric acid; the physiologically acceptable base is sodium bicarbonate, potassium bicarbonate, sodium carbonate, or potassium carbonate; and the physiologically acceptable salt is calcium chloride, potassium chloride or sodium chloride.

31. (previously presented) The method of claim 18, wherein the microbe is bacterium, a fungus, a protozoan, or a virus.

32. (currently amended) The method in accordance with claim 18, wherein the microbe is enterotoxigenic *Escherichia coli,* enteropathogenic *Escherichia coli, Shigella dysenteriae, Shigella flexneri, Salmonella typhimurium, Salmonella typhi, Salmonella abony, Salmonella dublin, Salmonella enteritidis, Salmonella hartford, Salmonella kentucky, Salmonella panama, Salmonella pullorum, Salmonella rostock, Salmonella thompson, Salmonella virschow, Enterobacter aerogenes, Vibrio cholerae, Yersinia enterocolitica, Campylobacter jejuni, Aeromonas hydrophila, Staphylococcus aureus, Staphylococcus hyicus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus warneri, Staphylococcus xylosus, Staphylococcus chromogenes, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus mutans, Streptococccus sanguis~~[[;]]~~[[,]] Pediococcus acne, Bacillus cereus, Bacillus anthracis, Bacillus subtilis,* a *Brucella* species, *Listeria monocytogenes, Legionella pneumophila, Bordetella pertussis, Pseudomonas aeruginosa, Legionella pneumophila, Francisella tularensis, Candida albicans, Brochothrix thermospacta, Bacillus pumilus, Enterococcus faecium, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Deinococcus radiopugnans, Deinococcus radiodurans, Deinobacter grandis, Acinetobacter radioresistens,* or *Methylobacterium radiotolerans.*

33. (previously presented) The method in accordance with claim 18, wherein the microbe is a verotoxic *Escherichia coli.*

34. (previously presented) The method in accordance with claim 33, wherein the verotoxic *Escherichia* coli is the serotype 0157:H7.

35. (previously presented) The method of Claim 18, wherein the microbe is a *Clostridium* species.

36. (previously presented) The method of Claim 35, wherein the species is *Clostridium perfringens, Clostridium difficult, Clostridium outline,* or *Clostridium titanic.*

37. (previously presented) The method of Claim 18, wherein the microbe is a protozoan selected from the group consisting of *Endameba histolytic, Nigeria flowery, Guardia labia, Leis mania spp., Trichomonas vaginalis, Trypanosoma spp., Plasmodium spp.,* and *Taxoplasma spp.*

38. (previously presented) The method in accordance with claim 18, wherein the concentration of lactoferrin on the surface of the composition subject to microbial contamination is from about 0.0001 to about 10 mg /sq.inch.

39. (previously presented) The method in accordance with claim 38, wherein the concentration of lactoferrin on the surface of the composition subject to microbial contamination is from about 0.01 to about 1 mg/sq. inch.

40. (currently amended) A method for inhibiting the microbial contamination of a composition subject to microbial contamination comprising treating the composition with an aqueous buffer solution containing a physiologically acceptable acid selected from the group consisting of oxalic acid, ethylenediamine tetraacetic acid, carbonic acid, and citric acid; a physiologically acceptable base; and a physiologically acceptable salt selected from the group consisting of calcium chloride, potassium chloride, and sodium chloride, wherein the ratio of acid to base to salt is 0.1 to 0.0001M (acid): 1 to 0.001 M (base): 10 to 0.01 M (salt) and containing a mixture of native lactoferrin and isolated lactoferrin

immobilized on a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues, collagen, gelatin, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate ~~or a triglyceride~~ via the N-terminus region of the lactoferrin, in a native lactoferrin to isolated immobilized lactoferrin molar ratio of from about 1:1 to about 1:5 and in a concentration of from about 0.001 to about 2.5 % wt/vol.

41. (previously presented) The method in accordance with claim 40, wherein the lactoferrin is immobilized on galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

42. (previously presented) The method in accordance with claim 40, wherein the mixture comprises about 1 % wt/vol immobilized lactoferrin and about 1 % wt/vol native lactoferrin.

43. (previously presented) The method in accordance with claim 40, wherein the physiologically acceptable acid is citric acid, the physiologically acceptable base is sodium bicarbonate and the physiologically acceptable salt is sodium chloride.

44. (previously presented) The method of claim 40, wherein the microbe is bacterium, a fungus, a protozoan, or a virus.

45. (currently amended) The method in accordance with claim 40, wherein the microbe is enterotoxigenic *Escherichia coli,* enteropathogenic *Escherichia coli, Shigella dysenteriae, Shigella flexneri, Salmonella typhimurium, Salmonella typhi, Salmonella abony, Salmonella dublin, Salmonella enteritidis, Salmonella hartford, Salmonella kentucky, Salmonella panama, Salmonella pullorum, Salmonella rostock, Salmonella thompson, Salmonella virschow, Enterobacter aerogenes, Vibrio*

cholerae, Yersinia enterocolitica, Campylobacter jejuni, Aeromonas hydrophila, Staphylococcus aureus, Staphylococcus hyicus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus warneri, Staphylococcus xylosus, Staphylococcus chromogenes, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus mutans, Streptococccus sanguis~~[[,]]~~[[,]] Pediococcus acne, Bacillus cereus, Bacillus anthracis, Bacillus subtilis, a *Brucella* species, *Listeria monocytogenes, Legionella pneumophila, Bordetella pertussis, Pseudomonas aeruginosa, Legionella pneumophila, Francisella tularensis, Candida albicans, Brochothrix thermospacta, Bacillus pumilus, Enterococcus faecium, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Deinococcus radiopugnans, Deinococcus radiodurans, Deinobacter grandis, Acinetobacter radioresistens,* or *Methylobacterium radiotolerans.*

46. (previously presented) The method in accordance with claim 40, wherein the microbe is a verotoxic *Escherichia coli.*

47. (previously presented) The method in accordance with claim 46, wherein the verotoxic *Escherichia coli is* the serotype 0157:H7.

48. (presently amended) The method of Claim 40, wherein the microbe is a *Clostridium ~~species~~ sp.*

49. (previously presented) The method of Claim 48, wherein species is *Clostridium perfringens, Clostridium difficile, Clostridium botulinum,* or *Clostridium tetani.*

50. **CANCELLED**

51. (previously presented) The method in accordance with claim 40, wherein the ratio of acid to base to salt is 0.01 to 0.001 M (acid) : 0.1 to 0.01 M (base) : 1 to 0.1 M(salt).

52. **CANCELLED**

53. **CANCELLED**

54. **CANCELLED**

55. **CANCELLED**

56. (previously presented) The method in accordance with claim 18, wherein the composition subject to microbial contamination is a foodstuff.

57. (previously presented) The method in accordance with claim 56, wherein the foodstuff is a meat product.

58. (previously presented) The method of claim 57, wherein the meat product is a beef product, a pork product, or a poultry product.

59. (previously presented) The method in accordance with claim 40, wherein the composition subject to microbial contamination is a foodstuff.

60. (previously presented) The method in accordance with claim 59, wherein the composition is a meat product.

61. (previously presented) The method of Claim 60, wherein the meat product is a beef product, a pork product, or a poultry product.

62. (previously presented) The method of claim 57, wherein the meat product is veal, lamb, sheep, goat, elk, deer, antelope, horse, or dog.

63. (previously presented) The method of claim 60, wherein the meat product is veal, lamb, sheep, goat, elk, deer, antelope, horse, or dog.

64. (previously presented) The method of claim 56, wherein the foodstuff comprises a surface and/or flesh of a marine or freshwater aquatic organism.

65. (previously presented) The method of claim 64, wherein the aquatic organism is a fish, mollusk, or crustacean.

66. (previously presented) The method of claim 59, wherein the foodstuff comprises a surface and/or flesh of a marine or freshwater aquatic organism.

67. (previously presented) The method of claim 66, wherein the aquatic organism is a fish, mollusk, or crustacean.

68. (previously presented) The method of claim 56, wherein the foodstuff comprises a vegetable foodstuff.

69. (previously presented) The method of claim 59, wherein the composition comprises a vegetable foodstuff.

70. (currently amended) A method for reducing the microbial contamination of a foodstuff meat product subject to microbial contamination by a microbe, comprising: applying to the meat product a composition containing a physiologically acceptable acid selected from the group consisting of oxalic acid,

ethylenediamine tetraacetic acid, carbonic acid, and citric acid; a physiologically acceptable base; and a physiologically acceptable salt selected from the group consisting of calcium chloride, potassium chloride, and sodium chloride, wherein the molar ratio of acid to base to salt is 0.1 to 0.0001 (acid) : 1 to 0.001 (base) : 10 to 0.01 (salt) and containing a mixture of native lactoferrin and isolated lactoferrin immobilized on a galactose-rich polysaccharide, collagen, gelatin, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate ~~or a triglyceride~~ via the N-terminus region of the lactoferrin, in a native lactoferrin to isolated immobilized lactoferrin molar ratio of from about 1:1 to about 1:5 and in a concentration of from about 0.001 to about 2.5 % wt/vol.

71. (previously presented) The method of claim 70, wherein the composition is an aqueous solution, an aqueous emulsion, a colloid, a suspension, a powder, or a granular solid.

72. (previously presented) The method in accordance with claim 70, wherein the lactoferrin is immobilized on a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

73. (previously presented) The method in accordance with claim 70, wherein the mixture comprises about 1 % wt/vol immobilized lactoferrin and about 1 % wt/vol native lactoferrin.

74. (previously presented) The method in accordance with claim 70 wherein the physiologically acceptable acid is citric acid, the physiologically acceptable base is sodium bicarbonate and the physiologically acceptable salt is sodium chloride.

75. (previously presented) The method of claim 70, wherein the microbe is bacterium, a fungus, a protozoan, or a virus.

76. (currently amended) The method in accordance with claim 70, wherein the microbe is enterotoxigenic *Escherichia coli,* enteropathogenic *Escherichia coli, Shigella dysenteriae, Shigella flexneri, Salmonella typhimurium, Salmonella typhi, Salmonella abony, Salmonella dublin, Salmonella enteritidis, Salmonella hartford, Salmonella kentucky, Salmonella panama, Salmonella pullorum, Salmonella rostock, Salmonella thompson, Salmonella virschow, Enterobacter aerogenes, Vibrio cholerae, Yersinia enterocolitica, Campylobacter jejuni, Aeromonas hydrophila, Staphylococcus aureus, Staphylococcus hyicus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus warneri, Staphylococcus xylosus, Staphylococcus chromogenes, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus mutans, Streptococccus sanguis~~[[,]]~~[[,]] Pediococcus acne, Bacillus cereus, Bacillus anthracis, Bacillus subtilis,* a *Brucella* species, *Listeria monocytogenes, Legionella pneumophila, Bordetella pertussis, Pseudomonas aeruginosa, Legionella pneumophila, Francisella tularensis, Candida albicans, Brochothrix thermospacta, Bacillus pumilus, Enterococcus faecium, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Deinococcus radiopugnans, Deinococcus radiodurans, Deinobacter grandis, Acinetobacter radioresistens,* or *Methylobacterium radiotolerans.*

77. (previously presented) The method in accordance with claim 70, wherein the microbe is a verotoxic *Escherichia coli.*

78. (previously presented) The method in accordance with claim 77, wherein the verotoxic *Escherichia coli is* the serotype 0157: H7.

79. (previously presented) The method of claim 70, wherein the microbe is a *Clostridium* species.

80. (previously presented) The method of claim 79, wherein the species is *Clostridium perfringens, Clostridium difficile, Clostridium botulinum,* or *Clostridium tetani.*

81. (previously presented) The method in accordance with claim 70 wherein the concentration of lactoferrin on the surface of the meat product is from about 0.0001 to about 10 mg /sq. inch.

82. (previously presented) The method in accordance with claim 70, wherein the concentration of lactoferrin on the surface of the meat product is from about 0.01 to about 1 mg/sq. inch.

83. (previously presented) The method in accordance with claim 70, wherein the meat product is a beef product, a pork product, or a poultry product.

84. (previously presented) The method of claim 70, wherein the meat product is veal, lamb, sheep, goat, elk, deer, antelope, horse, or dog.

85. (currently amended) A foodstuff~~[[,]]~~ containing: isolated lactoferrin immobilized on a naturally occurring substrate via the N-terminus region of the lactoferrin in a concentration between about 0.0001 and about 10 mg per gram of the foodstuff.

86. (previously presented) The foodstuff in accordance with claim 85, wherein the composition is a meat product.

87. (previously presented) The foodstuff of Claim 86, wherein the meat product is a beef product, a pork product, or a poultry product.

88. (previously presented) The foodstuff of claim 86, wherein the meat product is veal, lamb, sheep, goat, elk, deer, antelope, horse, or dog.

89. (previously presented) The foodstuff of claim 86, wherein the foodstuff comprises a surface and/or flesh of a marine or freshwater aquatic organism.

90. (previously presented) The foodstuff of claim 89, wherein the aquatic organism is a fish, mollusk, or crustacean.

91. (previously presented) The foodstuff of claim 85, wherein the foodstuff comprises a vegetable foodstuff.

92. (previously presented) The foodstuff of claim 86, wherein said foodstuff is a packaged foodstuff.

93. (presently amended) A method of inhibiting the growth and/or adhesion of a microbial species on a foodstuff, comprising: ~~Treating~~ treating a food-contacting surface of a material for food packaging or food handling with an isolated lactoferrin immobilized on a naturally occurring substrate via the N-terminus region of the lactoferrin; and contacting a foodstuff with said surface, whereby the growth and/or adhesion of a microbial species on said foodstuff is inhibited.

94. (previously presented) The method of Claim 93, wherein said food packaging or handling material is a cellulosic polymer.

95. (previously presented) The method of Claim 93, wherein said food packaging or handling material is paper, wood, or cardboard.

96. (currently amended) The method of Claim 93, wherein said food-contacting surface comprises a surface belonging to a shear wrap, a cellophane, a wrapping paper, a waxed paper, a bag, a carton, a box, a tray, a plate, a bowl, a food storage vessel, a serving dish, a cup, a bin, ~~ajar~~ a jar, or a bottle.

97. (previously presented) The method of Claim 97, wherein said food-contacting surface comprises a surface belonging to a glove, a mitt, a fork, a spoon, a knife, a slicer, a tong, a ladle, a scoop, a cup, a processor, a juicer, a grinder, a press, a hook, a chipper, a peeler, a cutter, a screw, an opener, a chute, a spatula, a cutting board, a kneading board, a rack, or a shelf.

98. (previously presented) A food container or food-handling implement, said container or implement having a food-contacting surface, said surface treated with an isolated lactoferrin immobilized on a naturally occurring substrate via the N-terminus region of the lactoferrin in an amount effective to inhibit the growth and/or adhesion of a microbial species on said surface.

99. (currently amended) The food container or food-handling implement of Claim 98, wherein said container or implement is a shear wrap, a cellophane, a wrapping paper, a waxed paper, a bag, a carton, a box, a tray, a plate, a bowl, a food storage vessel, a serving dish, a cup, a bin, ~~ajar~~ a jar, a bottle, a glove, a mitt, a fork, a spoon, a knife, a slicer, a tong, a ladle, a scoop, a processor, a juicer, a grinder, a press, a hook, a chipper, a screw, a cutter, a peeler, an opener, a chute, a spatula, a cutting board, a kneading board, a rack, or a shelf.

100. (previously presented) The food container or food-handling implement of Claim 98, having an amount of a between about 0.0001 to about 10 mg /square inch of said food-contacting surface.

101. (previously presented) An antimicrobial cleanser, polish, paint, spray, soap, or detergent for applying to an inanimate surface, containing an isolated lactoferrin immobilized on a naturally occurring substrate not including gelatin via the N-terminus region of the lactoferrin in an amount effective to inhibit the growth and/or adhesion of a microbial species on said surface.

102. (previously presented) A composition of matter comprising a dispersion of isolated lactoferrin immobilized on a naturally occurring substrate not including gelatin via the N-terminus region of the lactoferrin; and at least one pharmaceutically acceptable carrier.

103. (currently amended) The composition in accordance with claim 102, wherein the naturally occurring substrate is a protein, a polysaccharide, cellulose, a nucleic acid, or a nucleotide~~, or a lipid~~.

104. (currently amended) The composition in accordance with claim 102, wherein the naturally occurring substrate not including, gelatin is collagen, fibronectin, casein, mucin, heparan-sulfate, carrageenan, deoxyribonucleic acid, or adenosine triphosphate ~~or a triglyceride~~.

105. (previously presented) The composition in accordance with claim 102, wherein the naturally occurring substrate is a galactose-rich polysaccharide comprising mainly galactose residues and derivatized galactose residues.

106. (previously presented) The composition of claim 105, wherein .the dispersion is an aqueous solution, an aqueous emulsion, a colloid, a suspension, a powder, or a granular solid.

107. (previously presented) The composition in accordance with claim 102, further comprising native lactoferrin.

108. (previously presented) The composition in accordance with claim 107, wherein the concentration of immobilized lactoferrin and native lactoferrin in the dispersion is from about 0.05% wt/vol to about 2.5 % wt/vol.

109. (previously presented) The composition in accordance with claim 107, wherein the molar ratio of immobilized lactoferrin to native lactoferrin is a ratio of from about 1:1 to about 1:10.

110. (previously presented) The composition in accordance with claim 107, wherein the molar ratio of immobilized lactoferrin to native lactoferrin is a ratio of from about 1:1 to about 1:5.

111. (previously presented) The composition in accordance with claim 107, wherein the composition comprises about 1 % wt/vol immobilized lactoferrin and about 1 wt/vol native lactoferrin.

112. (previously presented) The composition in accordance with claim 107, wherein the composition further comprises a buffer system.

113. (previously presented) The composition in accordance with claim 112, wherein the buffer system contains a physiologically acceptable acid, a physiologically acceptable base, and a physiologically acceptable salt.

114. (previously presented) The composition in accordance with claim 113, wherein the physiologically acceptable acid is oxalic acid, ethylenediamine tetraacetic acid, carbonic acid, or citric acid; the physiologically acceptable base is sodium bicarbonate, potassium bicarbonate, sodium carbonate, or potassium carbonate; and the physiologically acceptable salt is calcium chloride, potassium chloride or sodium chloride.

115. (previously presented) The composition of claim 102, wherein the carrier is selected from the group consisting of solid, semisolid or liquid glucose, lactose, sucrose, gum acacia, agar, petrolatum, lanolin, dimethyl sulfoxide, normal saline, phosphate buffered saline, sodium alginate, bentonite, carbomer, carboxymethylcellulose, carageenan, powdered cellulose, cholesterol, gelatin, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methylcellulose, methylcellulose, octoxynol 9, oleyl alcohol, polyvinyl alcohol, povidone, propylene glycol monostearate, sodium lauryl sulfate, sorbitan esters, stearyl alcohol, tragacanth, xanthan gum, chondrus, glyercin, trolamine, avocado oil, almond oil, coconut oil, coconut butter, propylene glycol, ethyl alcohol, malt, and malt extract.

116. (previously presented) The composition of claim 102, further comprising a pharmaceutically acceptable emulsifier.

117. (previously presented) The composition of claim 116, wherein the emulsifier is selected from the group consisting of monoglyceride compounds, diglyceride compounds, glycerol, phosphatidyl ethanolamine, phosphatidyl choline, or lecithin.

118. (previously presented) The composition in accordance with claim 14, wherein the molar ratio of acid to base to salt is 0.01 to 0.001 M (acid): 0.1 to 0.01 M (base) : 1 to 0.1 M(salt).

119. (previously presented) The composition of claim 102, wherein the composition is formulated in a cosmetic, a cleanser, a food supplement, or a medicament.

120. (currently amended) The composition of claim ~~122~~ 119, wherein the cosmetic, cleanser, food supplement, or medicament is ~~119~~ formulated for applying to an external surface of a vertebrate subject.

121. (previously presented) The composition of claim 120, wherein the vertebrate subject is a human.

122. (previously presented) The composition of claim 120, wherein the vertebrate subject is a non-human vertebrate.

123. (previously presented) The composition of claim 119, wherein the cleanser is formulated as a pharmaceutically acceptable skin cleanser.

124. (previously presented) The composition of claim 119, wherein the medicament is formulated in a pharmaceutically acceptable delivery system.

125. (previously presented) The composition of claim 124, wherein said delivery system is an injection, intravenous drip, inhalant, or implant delivery system.

126. (previously presented) The composition of claim 124, wherein said delivery system is a transdermal delivery system.

127. (previously presented) The composition of claim 124, wherein said delivery system is a transmucosal delivery system.

128. (previously presented) The composition of claim 124, wherein said delivery system is an oral transmucosal delivery system.

129. (previously presented) The composition of claim 124, wherein said delivery system is a vaginal transmucosal delivery system.

130. (previously presented) The composition of claim 124, wherein said delivery system comprises an adhesive patch.

131. (previously presented) The composition of claim 124, wherein said delivery system comprises a gel, cream, ointment, suppository, sanitary wipe, bandage, or shampoo.

132. (previously presented) The composition of claim 124, wherein the delivery system is a mouth wash, gargle solution, denture cleanser, or dentifrice.

133. (previously presented) The composition of claim 124, wherein the delivery system is a toothpaste or chewing gum.

134. (previously presented) The composition of claim 124, wherein the medicament is formulated in a urogenital, rectal, or colonic delivery system.

135. (previously presented) The composition of claim 119, wherein the composition further comprises an antibiotic or probiotic agent.

136. (previously presented) The composition of claim 124, wherein the delivery system is a suppository, gel, or foam.

137. (previously presented) The composition of claim 127, wherein the medicament is formulated in an ingestive delivery system.

138. (previously presented) The composition of claim 137, wherein the ingestive delivery system is a tablet, capsule, caplet, troche, lozenge, coated or uncoated microspheres or particles, dispersible powder or granules, syrup, elixir, beverage, or food additive.

139. (previously presented) The composition of claim 138, wherein the tablet or capsule comprises a controlled release coating.

140. (previously presented) The composition of claim 138, wherein the ingestive delivery system comprises an enteric coating to prevent esophageal or gastric release of immobilized lactoferrin.

141. (previously presented) The composition of claim 124, wherein the delivery system comprises a lavage or enema.

142. (previously presented) The composition of claim 119, wherein the medicament is formulated for treating a human.

143. (previously presented) The composition of claim 142, wherein the composition is formulated for pediatric use.

144. (previously presented) The composition of claim 119, wherein the medicament is formulated for veterinary use.

145. (previously presented) The composition of claim 114, wherein the composition is formulated for use in a domestic or farm animal.

146. (previously presented) The composition of claim 114, wherein the composition is formulated for use in anon-human mammal or bird.

147. (previously presented) The composition of claim 146, wherein the composition is formulated for use in a non-human primate, mouse, rat, rabbit, gerbil, hamster, canine, feline, ovine, bovine, swine, pachyderm, equine, or marine mammal.

148. (previously presented) The composition of claim 146, wherein the composition is formulated for use in a chicken, duck, goose, turkey, ostrich, emu, dove, pigeon, quail, pheasant, peafowl, or guinea fowl.

149. (previously presented) The method of claim 18, wherein said composition subject to microbial contamination is a human.

150. (previously presented) The method of claim 149, wherein treating includes administering to said human said composition by a pharmaceutically acceptable delivery route.

151. (previously presented) The method of claim 150, wherein said delivery route is non-systemic.

152. (previously presented) The method of claim 151, wherein said non-systemic delivery route is a urogenital, rectal, or colonic delivery route.

153. (previously presented) The method of claim 151, wherein said non-systemic delivery route is a topical application of a cream, gel, or ointment.

154. (previously presented) The method of claim 150, wherein said delivery route is systemic.

155. (previously presented) The method of claim 154 wherein said systemic delivery route is by ingestion, injection, intravenous drip, inhalant, or implant.

156. (previously presented) The method of claim 154 wherein said systemic delivery route is a transdermal delivery route.

157. (previously presented) The method of claim 154 wherein said systemic delivery route is a transmucosal delivery route.

158. (previously presented) The method of claim 154, wherein the microbial contamination of a human to be reduced is in the gastrointestinal system of the human.

159. (previously presented) The method of claim 150, wherein treating further comprises administering an antimicrobial agent or probiotic agent in conjunction with the immobilized lactoferrin.

160. (previously presented) The method of claim 159, wherein the probiotic agent is a species of *Bifidobacterium, Streptococcus, Pediococcus, Lactococcus,* or *Lactobacillus.*

161. (previously presented) The method of claim 160, wherein the probiotic agent is *Bifidobacterium bifrdum, Bifidobacterium longum, Bifidobacterium animalis, Streptococcus lactis, Streptococcus cremoris, Streptococcus thermophilus, Pediococcus pentoseus, Lactococcus lactis, Lactobacillus acidophilus, Lactobacillus rhamnosus, Lactobacillus plantarum, Lactobacillus reuteri, Lactobacillus bulgaricus, Lactobacillus paracasei,* or *Lactobacillus casei.*

162. (previously presented) The method of claim 159, wherein the antimicrobial agent is an antibiotic.

163. (previously presented) The method of claim 162, wherein the antimicrobial agent is neomycin, metronidazole, teicoplanin, vancomycin, ciprofloxacin, doxycycline, tetracycline, augmentin, erythromycin, chloramphenicol, cephalexin, penicillin, ampicillin, kanamycin, rifamycin, rifaximin, rifampin, clindamycin, trimethoprim, a 4-amino salicylate compound, a 5-aminosalicylate compound, a sulfonamide compound, a betalactam compound, an aminoglycoside compound, a macrolide compound, or a quinolone compound.

164. (previously presented) The method of claim 149, wherein the microbe is bacterium, a fungus, a protozoan, or a virus.

165. (currently amended) The method in accordance with claim 149, wherein the microbe is enterotoxigenic *Escherichia coli, enteropathogenic Escherichia coli, Shigella dysenteriae, Shigella fiexneri, Salmonella typhimurium, Salmonella typhi, Salmonella abony, Salmonella dublin, Salmonella enteritidis, Salmonella hartford, Salmonella kentucky, Salmonella panama, Salmonella pullorum, Salmonella rostock Salmonella thompson, Salmonella virschow, Enterobacter aerogenes, Vibrio cholerae, Yersinia enterocolitica, Campylobacter*

jejuni, Aeromonas hydrophila, Staphylococcus aureus, Staphylococcus hyicus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus warneri, Staphylococcus xylosus, Staphylococcus chromogenes, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus mutans, Streptococccus sanguis~~[[,]]~~[[,]] Pediococcus acne, Bacillus cereus, Bacillus anthracis, Bacillus subtilis, a Brucella species, Listeria monocytogenes, Legionella pneumophila, Bordetella pertussis, Pseudomonas aeruginosa, Legionella pneumophila, Francisella tularensis, Candida albicans, Brochothrix thermospacta, Bacillus pumilus, Enterococcus faecium, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Deinococcus radiopugnans, Deinococcus radiodurans, Deinobacter grandis, Acinetobacter radioresistens, or *Methylobacterium radiotolerans.*

166. (previously presented) The method in accordance with claim 149, wherein the microbe is a verotoxic *Escherichia coli.*

167. (previously presented) The method in accordance with claim 166, wherein the verotoxic *Escherichia coli* is the serotype 0157:H7.

168. (previously presented) The method of claim 149, wherein the microbe is a *Clostridium* species.

169. (previously presented) The method of claim 168, wherein species is *Clostridium perfringens, Clostridium difficile, Clostridium botulinum, or Clostridium tetani.*

170. (previously presented) The method of claim 149, wherein the microbe is a protozoan selected from the group consisting of *Entamoeba histolytica, Naegleria flowleri, Giardia lamblia, Leishmania spp., Trichomonas vaginalis, Trypanosoma spp., Plasmodium spp.*, or *Taxoplasrna spp.*

171. (previously presented) The method of claim 18, wherein said composition subject to microbial contamination is a non-human vertebrate.

172. (previously presented) The method of claim 171, wherein treating includes administering to said non-human vertebrate said composition by a pharmaceutically acceptable delivery route.

173. (previously presented) The method of claim 172, wherein said delivery route is non-systemic.

174. (previously presented) The method of claim 173, wherein said non-systemic delivery route is a urogenital, rectal, or colonic delivery route.

175. (previously presented) The method of claim 173, wherein said non-systemic delivery route is a topical application of a cream, gel, or ointment.

176. (previously presented) The method of claim 172, wherein said delivery route is systemic.

177. (previously presented) The method of claim 176, wherein said systemic delivery route is by ingestion, injection, intravenous drip, inhalant, or implant.

178. (previously presented) The method of claim 176, wherein said systemic delivery route is a transdermal delivery route.

179. (previously presented) The method of claim 176, wherein said systemic delivery route is a transmucosal delivery route.

180. (previously presented) The method of claim 171, wherein the microbial contamination of a non-human vertebrate to be reduced is in the gastrointestinal system of the non-human vertebrate.

181. (previously presented) The method of claim 172, wherein treating further comprises administering an antimicrobial agent or probiotic agent in conjunction with the immobilized lactoferrin.

182. (previously presented) The method of claim 181, wherein the probiotic agent is a species of *Bifidobacterium, Streptococcus, Pediococcus, Lactococcus, or Lactobacillus.*

183. (previously presented) The method of claim 182, wherein the species is *Bifidobacterium bifidum, Bifidobacterium longum, Bifidobacterium animalis, Streptococcus lactis, Streptococcus cremoris, Streptococcus thermophilus, Pediococcus pentoseus, Lactococcus lactis, Lactobacillus acidophilus, Lactobacillus rhamnosus, Lactobacillus plantarum, Lactobacillus reuteri, Lactobacillus bulgaricus, Lactobacillus paracasei,* or *Lactobacillus case.*

184. (previously presented) The method of claim 181, wherein the antimicrobial agent is an antibiotic.

185. (previously presented) The method of claim 184, wherein the antimicrobial agent is neomycin, metronidazole, teicoplanin, vancomycin, ciprofloxacin, doxycycline, tetracycline, augmentin, erythromycin, chloramphenicol, cephalexin, penicillin, ampicillin, kanamycin, rifamycin, rifaximin, rifampin, clindamycin, trimethoprim, a 4-amino salicylate compound, a 5-aminosalicylate compound, a sulfonamide compound, a betalactam compound, an aminoglycoside compound, a macrolide compound, or a quinolone compound.

186. (previously presented) The method of claim 171, wherein the microbe is a bacterium, a fungus, a protozoan, or a virus.

187. (currently amended) The method in accordance with claim 171, wherein the microbe is enterotoxigenic *Escherichia coli, enteropathogenic Escherichia coli, Shigella dysenteriae, Shigella flexneri, Salmonella typhimurium, Salmonella typhi, Salmonella abony, Salmonella dublin, Salmonella enteritidis, Salmonella hartford, Salmonella kentucky Salmonella panama, Salmonella pullorum, Salmonella rostock Salmonella thompson, Salmonella virschow, Enterobacter aerogenes, Vibrio cholerae, Yersinia enterocolitica, Campylobacter jejuni, Aeromonas hydrophila, Staphylococcus aureus, Staphylococcus hyicus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus warneri, Staphylococcus xylosus, Staphylococcus chromogenes, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus mutans, Streptococccus sanguis~~[[,]]~~[[,]] Pediococcus acne, Bacillus cereus, Bacillus anthracis, Bacillus subtilis,* a *Brucella* species, *Listeria monocytogenes, Legionella pneurnophila, Bordetella pertussis, Pseudomonas aeruginosa, Legionella pneumophila, Francisella tularensis, Candida albicans, Brochothrix thermospacta, Bacillus pumilus, Enterococcus faecium, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Deinococcus radiopugnans, Deinoeoccus radiodurans, Deinobacter grandis, Aeinetobacter radio resistens, or Methylobacterium radiotolerans.*

188. (previously presented) The method in accordance with claim 171, wherein the microbe is a verotoxic *Escherichia coli.*

189. (previously presented) The method in accordance with claim 188, wherein the verotoxic *Escherichia coli* is the serotype 0157:H7.

190. (previously presented) The method of claim 171, wherein the microbe is a *Clostridium* species.

191. (previously presented) The method of claim 190, wherein species is *Clostridium perfringens, Clostridium difficile, Clostridium botulinum, or Clostridium tetani.*

192. (previously presented) The method of claim 171, wherein the microbe is a protozoan selected from the group consisting of *Entamoeba histolytica, Naegleria flowleri, Giardia lamblia, Leishmania spp., Trichomonas vaginalis, Trypanosoma spp., Plasmodium spp.*, or *Taxoplasrna spp.*

193. (previously presented) The method of claim 171, wherein said non-human vertebrate is a domestic or farm animal.

194. (previously presented) The method of claim 171, wherein said non-human vertebrate is a mammal or bird.

195. (previously presented) The method of claim 171, wherein said non-human vertebrate is a non-human primate, mouse, rat, rabbit, gerbil, hamster, canine, feline, ovine, bovine, swine, pachyderm, equine, or marine mammal.

196. (previously presented) The method of claim 171, wherein said non-human vertebrate is a chicken, duck, goose, turkey, ostrich, emu, dove, pigeon, quail, pheasant, peafowl, or guinea fowl.

197. (previously presented) The method of claim 18, wherein said composition subject to microbial contamination is a biological surface or a biological fluid.

198. (previously presented) The method of claim 197, wherein the fluid is a culture medium.

199. (previously presented) The method of claim 197, wherein the biological surface or fluid is in vitro.

200. (previously presented) The method of claim 197, wherein the biological surface is a cell surface, membrane surface, mucosal surface, epithelial surface, lumenal surface, skin surface, or eggshell surface.

201. (previously presented) The method of claim 197, wherein the biological surface is an epithelial or mucosal surface.

202. (previously presented) The method of claim 197, wherein the biological fluid is semen, blood, lymph, urine, prostatic fluid, saliva, gastric juice, mucus, synovial fluid, pleural exudate, peritoneal exudate, pericaridal exudate, or cerebro-spinal fluid.

203. **CANCELED.**